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EDITORIAL.

Plant Disease Problems.

Those interested in agriculture and whose residence in Malaya has extended over many years doubtless can recall outbreaks of plant diseases which, at the time, were said to threaten the future of the industry connected with the plants on which they occurred. In every such case the nature of the disease was successfully studied and methods devised for combating the disease, the danger being thus overcome or greatly minimised.

The danger from such diseases was real enough and it is to the credit of the mycologists in this country that they succeeded in recommending measures of treatment before the disease became so widespread as to defy efforts to control it.

The successful control of plant diseases calls for ceaseless vigilence, not only by scientists, but by those engaged in agriculture, in order that any new outbreak of disease may receive attention before it has caused considerable damage to the crop. This vigilence is all the more necessary to-day, for when a crop has gained a position of importance, the damage of epidemic disease is increased as the population of plants of one kind is then great and estates are no longer isolated by jungle or other crops.

At one time agricultural enterprise in this country was confined to but one or two crops: at the present time there are a number of crops grown commercially and while none have assumed the importance of rubber, coconuts or rice in the agricultural commerce of Malaya, nevertheless they form a valuable integral part of the system of agriculture and are certain to assume an even greater degree of importance in the future. The future development of any of these smaller agricultural industries depends in large measure on the success in maintaining the crop to-day reasonably free from serious fungoid diseases.

The Notes published in this number give information on studies made during the past two years of fungus diseases on a number of crops cultivated locally. The diversity of the crops which are included in these notes illustrates our remarks above concerning possible future developments in agriculture. The Division of Plant Pathology of the Department in publishing these notes not only places on record an account of useful work but makes readily available to the reader information which otherwise might not come to the notice of the practical agriculturist.

Malayan Rice Production in 1938.

The desirability of ensuring an adequate supply of rice in Malaya is fully recognised in all quarters, although there may still be divergent views as to the most effective policy to achieve this object. But whatever policy be adopted, the production of rice within the borders of this country must always remain a factor of the very greatest importance. It follows, therefore, that everything that can be done, such as improved irrigation, improved varieties of seed, will add to the attractiveness of the crop by making its cultivation more remunerative, while the development of communications, improved sanitation, and the encouragement of subsidiary industries, by adding to the amenities of the population, will encourage the colonization of areas developed for this crop.

Despite the efforts made to encourage padi cultivation by such means as outlined above, it remains a matter of difficulty to maintain the proportion of local production to total consumption, because except for isolated years of trade depression, the total amount of rice required increases annually. Thus, in 1938 net imports increased by nearly 50,000 tons while local production, due in large measure to an unsuitable season, dropped by 20,000 tons. Consequently, Malaya produced only 33 per cent. of requirements, the remainder being imported mainly from Siam and Burma.

Total consumption of rice in Malaya during 1938 exceeded 900,000 tons, the highest on record, and the cost of imports of rice exceeded $40,000,000, the highest since 1930 when the value of imports was about 50 per cent. greater than in 1938.

The above statements are drawn from an account of the rice position in Malaya which will be found in this number. Amongst other interesting facts brought to light by this article is that although the price of all grades of rice was less in 1938 than in the previous year a greater quantity of the better grades was consumed than in 1937, so that the rice-eating population thus paid more for their requirements in 1938 than they did in the previous year.

Original Articles.

NOTES ON PLANT DISEASES IN 1937—1938

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The following notes have been prepared from the Annual Reports of the Division of Plant Pathology 1937-1938 for publication in this Journal instead of, as previously, in a Special Bulletin containing the Annual Reports of the Research Branch. Publication of this Special Bulletin was discontinued in 1937.

In the notes below the diseases and fungi which have been investigated or recorded on crops in 1937-1938 are discussed.

Oil Palms.

1. *Stem-rot.*

The results of observations made on this disease at the Central Experiment Station, Serdang, and on estates, were summarized in 1937 and published as Bulletin No. 21, Scientific Series, in 1938. The disease has now been recorded on the majority of oil palm estates in this country but, except in areas where soil conditions are unfavourable to vigorous growth, it has not caused extensive damage and is not now looked upon as a serious menace to the industry, although when it first made its appearance some years ago the disease had affected so many palms, in the area involved, that it was looked upon with considerable disquietude.

The disease may become epidemic on areas of deep peat or in quartzite valley soils with a pan of sandy subsoil. It is less common on lateritic soils but may appear in areas with rocky outcrops in the subsoil. In palms growing well, in good soil, the disease is of minor importance, but may attack the less vigorous palms, particularly if they have, for any reason, declined in vigour or suffered a check to growth.

During recent years a general deterioration of the palms, marked by a falling off in yield and a bronzing or yellowing of the outer leaves, has occurred on a number of estates in fields of deep peat or in valley areas with subsoil sand-beds. Stem-rot has been active in some of these areas on which the incidence of the disease is likely to increase if control measures are not adopted.

In connexion with control measures, preventive painting of the surface of leaf bases is not now recommended on grounds of expense. "Hat-peg" pruning (*i.e.* leaving a fairly long portion of petiole on the stem) is a method which reduces wounding and should confer a measure of protection.

Felling and burying the stems of diseased palms is recommended as a sanitary measure. It has been found that, although the roots of adjacent palms will make contact with the buried stems, the roots are not attacked by *Fomes noxius*, the

fungus which causes the commonest form of the disease. Burial, however, may be attended by some risk if the causal fungus is *Ganoderma lucidum*—a less common cause of a form of stem-rot—or if *Ustulina zonata* is growing in the old leaf bases.

Treatment by excision of diseased tissue and protection of the exposed tissue has given good results in many cases, in that the progress of the disease in individual palms has been arrested and the life of the palms prolonged. Treatment, however, is recommended only for palms which can be expected to maintain yields in areas where "supply" palms do not succeed or are unlikely to do better than the palms they would replace.

In addition to the fungi *F. noxius* and *G. lucidum* a third fungus was recorded as the cause of a decay of the stem tissue. This fungus forms a type of mycelial growth in pure culture dissimilar to the fungi mentioned above or to that of other fungi whose fructifications have been collected from the leaf bases, *e.g. Ganoderma applanatum* var. *tornatum, Poria Ravenalae, Fomes lamaensis, Polystictus sanguineus* or agarics all of which are saprophytes.

It has been shown that the stem-rot fungi, *F. noxius* and *G. lucidum,* do not rapidly kill an infected palm and that, following infection, a period of from one to three years may elapse before a palm is killed. The newly recorded fungus appears to be even slower in its action than *F. noxius* or *G. lucidum.* It has not yet been identified, since fructifications have not been found, but it is probably a Polypore.

2. *Leaf Diseases.*

During periods of dry weather the leaves of oil palm seedlings may be attacked by weak parasites if the nursery soil becomes excessively dry. Two fungi were recorded under these conditions in 1938, *i.e. Pestalozzia palmarum* causing greyish-brown lesions, and *Helminthosporium* sp. causing a darker brown, more linear leaf spot, or a brown decay of the edges of the leaves. These fungi were also present on leaves of seedlings which developed a yellow spotting suspected to be caused by red spiders (*Tetranychus* sp?).

The fungus Helminthosporium was also isolated from a leaf disease of young palms growing in an area where older palms had begun to die back, due presumably to an adverse soil factor. The leaves of the young palms withered and, in some cases, the decay extended to the bud and the palms died. Rainfall was well below the average for the district about the time the trouble appeared and this may have influenced the incidence of the disease. The fungus was inoculated into the leaves of young, healthy palms, growing in another area, but it failed to cause damage, and consequently is regarded as a facultative parasite.

A curious bending of the petioles of the oldest leaves of mature oil palms occurred on a peat area. The affected petioles were of abnormal length and bent over in a curve near the point of attachment to the stem and, in some cases, the tips touched the ground to form a "tent" around the stem. The leaves were dark green in colour and the palms had made excellent growth and had yielded well up

to the time bending of the petioles occurred. The cause of the bending is not yet known, but it is perhaps suggestive that the palms had been regularly manured with rock phosphate alone for some years, and this may have contributed to a nutritional disturbance.

A leaf disease affecting about 20 acres of four-year-old palms was reported in 1937. The infection was largely confined to the younger leaves and involved anything from a few square inches of tissue to the complete frond. The fungi associated with the infection were mainly Mycosphaerella and Phyllosticta. It was considered that there was probably something in common between the origin of this outbreak and that of "Crown disease" as the palms were at an age when the latter disease is likely to appear.

3. *Moulds of Oil Palm Kernels.*

Infection by *Mucor* sp. and bacteria during the process of drying the nuts was found to occur in the bins into which the nuts are piled after depericarping. The initial heating which occurs (up to 64°C) in the bins is probably due to the action of thermophyllic bacteria.

As the temperature falls *Mucor* sp. and bacteria develop on and within the shells and in some cases within the kernels. The organisms enter mainly *via* the germination pore at the end of the nut.

After separating the kernels from the shells some kernels become spotted with an exudate of a greasy substance. The tissue of these kernels is permeated by mycelium of *Mucor* sp., often forming spores in cavities formed in the tissue or in the central air space.

Other fungi isolated from mouldy kernels were *Fusarium* sp., *Aspergillus* sp., *Trichoderma* sp.

Mucor sp., however, appears to be the most commonly occurring organism in the shells and kernels.

Coconuts.

No important disease was reported during the period under review. Lightning injury, however, was again diagnosed as the cause of death or injury to groups of palms in the main coconut districts.

Pineapples.

1. *Fruitlet Brown Rot.*

A preliminary account of the fruit rots of the Singapore Canning variety of pineapple in Malaya was published in this Journal in 1937.

The affection known as "Fruitlet brown rot" in this variety also occurs locally in fruits of the Sarawak (Smooth Cayenne) variety, which is grown for home consumption in Malaya and is not canned. The yellow bacillus associated with the fruitlet-rot of the canning variety is also the prominent organism in the Sarawak variety, which appears to be highly susceptible to the disease, *e.g.* observations on fruits from two adjacent plots showed that whereas 12 per cent. of fruits of the

canning variety were lightly affected, 80 per cent. of the Sarawak fruits were so heavily blemished that most of them would be considered unfit for canning or consumption. It is perhaps significant, in view of the scanty growth of the yellow bacillus on culture media below pH 4.0, that the juice of the fruits of the canning variety was considerably more acid (pH 3.85) than that of the Sarawak fruits (pH 4.5).

2. *Fruit Collapse.*

This disease has been recorded only in the State of Johore. The cause is still obscure and all attempts to reproduce the disease, by various means, in clonal material have failed.

3. *Heart-Rot.*

This disease of young plants is characterized by a decay of the base of the "heart" leaves and the top portion or side of the stem. The trouble has occurred only in Johore and is responsible for a steady loss, monthly, of young plants on the Experiment Station and on estates, but not in sufficient numbers to cause alarm. The symptoms of the disease closely resemble those of heart-rot caused by the fungus Phytophthora in Hawaii, but, possibly on account of the difficulty of finding early stages of the disease, this fungus has not been isolated from the disease locally. *Fusarium* sp. and several species of bacteria, which are saprophytes, are invariably present in the decayed tissues and are the only organisms constantly isolated in culture from the rather advanced stages of the disease, which are the only stages that, so far, have been found in the field. It is more usual to find single plants affected than to find groups, or even pairs, of diseased plants, which suggests that if a parasitic organism is the cause of the disease, some factor affecting individual plants may be operating to influence susceptibility.

In view of the failure to isolate a pathogen from the diseased tissue, it was decided to study the effect of inoculation with various species of Phytophthora and Pythium. (The majority of these were kindly supplied by the Imperial Mycological Institute, Kew.). Plants of the Singapore Canning variety, growing in pots and in the field (in Selangor), were inoculated in various ways, but the disease was not reproduced. Typical symptoms, however, were produced on single leaves in the laboratory, which were placed in Roux tubes, kept moist, and inoculated on the white basal portion, using as the inoculum strains of *Phytophthora parasitica* from delphinium and tobacco, and *P. palmivora* (cacao group). No result was obtained with *P. meadii* (rubber), *P. meadii* var *ananaphthorus* (pineapple), *P. palmivora* (rubber), *Pythium splendens* var. *hawaiianum* (from *Piper betle*), and *Pythium complectens* (durian).

Suckers and crowns were placed in coplin jars, so that the bases were in water, and were inoculated with the fungi mentioned above. One young plant, inoculated with *P. palmivora* (cacao group), developed heart-rot, but the remainder were not affected. All these plants formed roots and were inoculated again at intervals, but without effect.

The results of these inoculations indicate that Phytophthora and Pythium are not aggressive parasites of Singapore Canning pineapple plants, but that, under certain conditions, strains of *P. parasitica* and *P. palmivora* (cacao group) can attack the tissues of leaf and stem.

In attempts to re-isolate the fungus from the successful leaf inoculations, it was found that re-isolation succeeded only when cultures were made soon after the tissue began to show signs of invasion. After 10 to 12 days, however, when the successfully inoculated leaves began to lose colour, only *Fusarium* sp. and bacteria were obtained from the tissue at the margin of the basal rot. Subsequent inoculations showed that these were saprophytes.

It is quite possible, therefore, that the failure to isolate Phytophthora from the diseased plants in Johore may be due to the fact that the tissue is rapidly invaded by secondary organisms, and final proof that Phytophthora (*P. parasitica*? which occurs in Johore on other crops) is the causal organism must await isolation of the fungus from diseased material. The fact that the rot is well advanced before the leaves begin to lose colour renders it difficult to discover early stages of infection, particularly when the disease does not appear necessarily to spread to adjacent plants in which early stages could be looked for.

Tea.

1. *Red-root Disease.*

Red-root disease caused by *Ganoderma pseudoferreum* appears to be the most common root disease of lowland tea. The disease usually occurs in scattered patches in which the bushes wilt rather suddenly, so that in an infected area a group of from 15 to 50 bushes, which were normal in appearance at the beginning of the week, may be withered and dead by the end of the week.

Infection can frequently be traced to a jungle or shade-tree stump, but occasionally, when only one or two bushes are affected, the source of infection may not be obvious. The common shade-trees Albizzia and Gliricidia are both susceptible to attack.

The disease may also arise in a living shade-tree and spread to the tea bushes by root contact. Some typical instances of this were observed in one field at the Central Experiment Station, Serdang, where a few of the Albizzia shade-trees began to show signs of root disease and, later, groups of tea bushes around these trees died from red-root disease. It was found that the disease had spread outwards along the lateral roots of the shade-trees to a distance of about 15 feet and had infected the roots of those tea bushes whose roots were in contact with diseased Albizzia roots.

In another instance a lateral root of an Albizzia tree had become infected through contact with a diseased patch and the disease had extended about 10 feet along this root in the direction of the tap root. (Plate 1, Fig. 1.). A few tea bushes in a line had died as a result of infection through contact of their roots with the diseased Albizzia root.

The rather sudden wilting of affected tea bushes appears to be due to the fact that, frequently, only one or two of the lateral roots on one side of a bush are first infected. The fungus travels along these roots to the tap root and then up to the collar. The unaffected lateral roots provide food until the fungus girdles the tap root and the underground portion of the stem, after which the cortical tissues of the stem at the collar appear to be "ringed" rather suddenly and the leaves wilt. It has not yet been determined how soon, after the mycelium encircles the collar underground, penetration into the cortex occurs, but specimens of young "supply" plants have been found on a few occasions with no signs of wilt, although the tap roots and the collar below soil level were encircled with the skin of red mycelium under which the cortex at the collar was still healthy.

The lateral roots of Albizzia can extend to a considerable distance from the trunk, and if they become infected with red-root disease can undoubtedly spread the disease to the tea bushes so that, from the root disease aspect, this useful shade tree is perhaps an "undesirable."

It appears, however, that the presence of root disease in Albizzia would be disclosed before extensive spread occurred and this would facilitate early isolation of the diseased patches by trenching.

The mycelium of the red-root fungus does not grow on roots exposed to the air and it has recently been suggested(1) that a method of controlling this disease, in tea, by exposing the upper lateral roots and the tap-root of bushes surrounding a diseased patch might give better results than trenching. (Plate 1, Fig. 2.). An investigation of this method was made at Serdang, but it would appear that the presence of infected shade tree roots, between the bushes, might render the method less safe than the trenching method. The exposure method has not harmed the bushes so treated, but it is difficult to apply in stiff soil.

2. *Other Root Diseases.*

Ustulina zonata also causes root disease in tea bushes and appears to be the most common cause of root disease at Cameron Highlands.

In lowland tea, at the Central Experiment Station, Serdang, the bushes have not been affected in large groups; usually only single bushes have been attacked at any one time. The disease is invariably associated with old stumps of Grevillea shade-trees which were cut down some years ago. On these stumps fructifications of the fungus are freely produced and the spores are liable to spread infection.

Brown-root disease and Rosellinia root-rot are fairly common on tea at Cameron Highlands, where they are of more importance on tea seed-bearers than on bushes in the field. The root exposure method might be of value in checking Rosellinia if the mycelium reacts like that of *G. pseudoferreum.*

It has definitely been established, by comparison of cultures from roots affected by brown-root disease with cultures from fructifications developed on these roots, that the causal fungus of brown-root disease of tea is *Fomes noxius.*

(1) J. S. Vollema. De Bergcultures XI. 43. 1937.

Fig. 1. Lateral root of Albizzia infected with red-root disease and capable of infecting the bushes in the background.

Fig. 2. Tea bush with soil removed from lateral roots and collar to check red-root disease.

Fig. 3. Nutmeg Fruit-Split.
The skin of the centre fruit has been shaved to show the internal rot.

Fig. 4. *Fomes noxius* and a black-line fungus on Avocado.

Derris.

Curiously enough this plant, which yields a valuable insecticide, is more subject to insect attack than to attack by fungi.

When grown in soil infected with *Fomes lignosus* the roots may become covered with the white rhizomorphs of this fungus which, however, appear to remain entirely on the surface, and, up to now, there is no authentic record of damage to derris by *F. lignosus*. The matter is of some importance in view of the fact that derris is frequently grown as a catch crop with young rubber trees.

Fruits.

(A). Durian (*Durio zibethinus*).

A root disease of eight-year-old trees occurred on an estate in Singapore, and resulted in the death of about 50 trees. The fungus *Pythium complectens* was isolated from the roots and proved on inoculation to be parasitic on durian root and stem tissue. It was concluded that, on this occasion, the fungus was acting as a facultative parasite of the roots of durian trees growing on a sloping area in which erosion had occurred to an extent sufficient to affect the vigour of the trees. It was also shown that *P. complectens* is capable of acting as a vigorous wound-parasite of the stem of durian to cause patch canker.

The leaves of seedlings and bud-grafted plants of durian at Serdang were attacked by anthracnose caused by *Colletotrichum* sp., and by rim-blight caused by a species of Phyllosticta. The soil in which the affected plants were growing was rather stiff, but had been well manured with compost.

An incurling of the young leaves also occurred on this area, but was possibly due to attack by red spider.

Trouble was experienced on various Agricultural Stations from a die-back of the scion of bud-grafted plants. The cause was traced to decay of the snag of the stock by *Diplodia* sp., which occasionally extended below the junction of stock and scion and cut off food supplies to the latter so that it wilted and died.

Treatment of the snag after cutting, by applying cow-dung and clay mixture or whitewash and cryptonol alone and in combination, is being tried as a preventive measure.

(B). Rambutan (*Nephelium lappaceum*).

(1) *Mildew.*

A splitting of maturing fruits combined with a decay of the outer skins and finally decay of the exposed pulp is a trouble which has from time to time occurred in rambutans. Numerous specimens have been examined but no definitely parasitic fungus was observed until 1938, when specimens of young green fruits were received

from Johore. The skin of the fruits was decayed with a brown rot on one side and had split to expose the pulp.

A mildew was present on the decayed tissue and was identified as *Oidium* sp., a parasitic fungus not hitherto recorded on *Nephelium* spp. In shape and size (30 x 24 microns) the spores of the fungus resemble *Oidium heveae*, but inoculation of young rubber leaves gave no result. This may have been due to desiccation of the spores, which are short lived.

This fungus was also recorded on young rambutan plants at Cheras, Selangor, causing a black, wet rot which destroyed the younger leaves.

(2) *Seedling Wilt.*

A decay of the middle portion of the stems of young seedlings occurred at Bukit Mertajam. About 2 inches of the cortex and wood of the stems was affected and the leaves wilted. The only fungus found in the tissue was *Diplodia* sp., indicating that a weakening of resistance of the tissue due to some outside factor had occurred. There was a possibility that sodium nitrate, applied as a manure in liquid form, had started the trouble, but a disease of this nature is more often due to "sun-scorch."

(3) *Stem and Branch Disease.*

The disease reported under this heading in 1936, in which the bark becomes raised and split and the branches become "warty" and sometimes swollen at the affected points, appears to be very common, but does not do serious injury to well grown trees.

Fungi including Nectria, Limacinia, Fusarium, Diplodia and *Pestalozzia* sp., with very large spores, have been isolated from the affected bark and, along with two species of bacteria isolated from the outer cortex, have repeatedly been inoculated into healthy trees, but without result. Failure to reproduce the disease also occurred when affected bark was used as the inoculum.

(C). Citrus.

(1) *Canker (Phytomonas citri).*

Bacterial Canker is perhaps the most prevalent disease of citrus in Malaya. It was recorded this year on Italian lime at Serdang in a form not quite typical of the trouble as it occurs on other varieties, in that the cankers are fewer and larger and tend to cause circular lesions on the leaves of this fairly resistant variety.

Isolations from the leaves gave two species of bacteria, of which one resembled *P. citri* and gave a positive result on inoculation.

Inspections for canker of citrus species growing at Cheras, Serdang and Kuala Lumpur were made in October and December 1938, and the following list of species and varieties resistant and susceptible to canker was drawn up.

Very Susceptible	Susceptible	Resistant (r). or Immune (i).
Japanese citron	Saramaca citron	Tahiti lime (r)
Rough lemon	Grape fruit	*Citrus sunkii* (i)
Local lime	Lemon Villa Franca	Satsuma orange (r)
	Lemon Villa Granda	Italian lime (r)
	Citrus hystrix	Limau telor buaya (i)
		Triphasia aurantifolia (i)
		Pomelo (r)
		Sour orange (r)
		Valencia late orange (r)
		Mediterranean sweet orange (r)
		Mandarin orange (r)
		Kumquat (r)

The varieties shown above as immune are so listed because canker was not recorded on them. Some may be slightly susceptible, as it is doubtful if any citrus variety is absolutely immune.

(2) *Bark-rot.*

A serious bark-rot leading to canker or death of individual branches of the Mediterranean sweet orange occurred at Serdang. The disease appears to be identical with bark-rot of citrus recently reported from Java, where it is ascribed to *Fusarium* sp. with a perfect stage—*Nectria cocicola.*

A *Fusarium* sp. which forms a Nectria stage in pure culture was isolated from the disease at Serdang, but inoculations have, so far, given no result.

One tree was treated by excision of diseased cortex and application of Izal 2 per cent. Callus formation proceeded satisfactorily and the affected branches (one of which was almost ringed by the disease) are recovering. Branches of untreated trees died.

(3) Pomelo seedlings are sometimes heavily encrusted with a diaspid scale insect. The scale is frequently parasitised by an entomogenous fungus, red in colour. This fungus has been identified as *Calonectria diploa* (B & C) Wr. with a conidial stage *Fusarium juruanum* P. Henn. It was also recorded on scale of hevea leaves.

(4) *Sphaerostilbe repens* was recorded in 1938 on lemon trees killed by a root disease at Kuala Kangsar, Perak.

(D). Banana.

Panama disease continues to give trouble in certain areas in Pahang and Negri Sembilan. From the description of symptoms and the presence of bacteria in the first imperfect specimens received from these areas in 1938 it was thought that bacterial wilt, (*B. solanacearum*), which causes serious damage to bananas in the

Western tropics, might be present. The bacteria were later shown to be secondary saprophytes and further investigation proved that Panama disease (*Fusarium cubense*) was the cause of the trouble. The varieties affected were Pisang Embun and Pisang Rastali.

Pisang Serendah (*Musa Cavendishii*) was badly attacked by nematodes at Bukit Mertajam in 1938. The roots were affected in patches which turned black, the leaves began to wither prematurely, growth was stunted and the fruits were few and small. The record is of interest because, in the West Indies, this variety is said to be less liable to attack by nematodes than other varieties.

(E). Avocado.

The fungus *Fomes noxius,* which causes oil palm stem-rot, was isolated from a brown decay at the base of the stem of an avocado pear tree which was blown over at Serdang. The tap root and one lateral of this tree were also attacked by a black-line fungus resembling *Ustulina zonata,* but the other roots were healthy. (Plate 2, Fig. 4.).

(F). Papaya.

The fungus *Helminthosporium papayae* and *Mycosphaerella caricae* were associated with a leaf disease of the imported Morado variety of papaya at Serdang. The weather had been dry for some weeks and this factor undoubtedly influenced the development of these fungi, which damaged large areas of the leaves. The disease, which soon disappeared when rainy weather began, appears to be common in the Philippines, but has not previously been recorded in Malaya.

Cacao.

The cacao trees at Serdang were inspected periodically so that early action could be taken if Phytophthora pod-rot, Witches Broom (*Marasmius perniciosus* Stahel), or other major disease should appear. Up to now no serious disease has occurred. All the pods, however, are rendered very unsightly as a result of attack by an insect (Helopeltis).

The insect damage is superficial and possibly may not be so markedly evident if secondary fungi could be prevented from attacking the injured epidermal tissue. The principal fungi which have been isolated from the superficial lesions on the pods are species of Fusarium and the Anthracnose fungus Colletotrichum. (Plate 3).

A species of Phoma appears to be the agent of decay of young pods which "set" but do not develop. Whether the fungus (which belongs to a group of which some members are weak parasites) is the cause of the failure of the pods to develop has not yet been determined.

Spices.

(A). Nutmeg.

A disease characterized by the development of lesions on the pericarp of nutmeg fruits, followed by the splitting and falling of the fruit, occurred in Province Wellesley and Malacca. (Plate 2, Fig. 3.). The symptoms are typical of a disease

Figs. 5 & 6. Cacao Pods damaged by Helopeltis and Fungi.

well known in Java, caused by the fungus *Coryneum myristicae*, which is said to cause annual losses of about 50 per cent. of the crop in some districts. A fungus of the Coryneum type (conidia 49x5 microns) was associated with the disease in the localities mentioned above.

(B). Clove.

The fungus *Rhizoctonia bataticola* was associated with a root disease of clove trees growing on shallow soil in Penang.

Vegetables.

(A). Potato and Tomato.

Blight (*Phytophthora infestans*) was again recorded on these crops at Cameron Highlands. In addition to attacking the foliage the fruits of the affected tomatoes were badly decayed by the fungus.

A number of varieties of potatoes indigenous to South America were planted this year at Tanah Rata Some of them were attacked by *P. infestans* and later developed a storage rot of some of the tubers.

Potato cultivation at Cameron Highlands is rendered difficult on account of the susceptibility of the crop to blight and slime disease (*Bacterium solanacearum*). While it should be possible to control blight by spraying, coupled with planting the seed so that the main growth period occurs in the drier months, growing resistant varieties, and attempting to eradicate the "wild" potato plants which are now growing as weeds in many places, (and are a continual source of infection), the only practical method of combating slime disease is to grow resistant varieties. Unfortunately a number of the varieties resistant to this disease appear to be very susceptible to blight and *vice-versa*. Blight has recently appeared for the first time in Java and has caused considerable damage and, for a while, a shortage of seed potatoes. The shortage was aggravated by a destructive disease caused by *Colletotrichum atramentarium*, which appeared on imported seed potatoes. This disease has not yet occurred in Malaya.

(B). Beans.

A leaf disease of minor importance was observed on beans in several holdings at Cameron Highlands. The causal fungus was *Cercospora cruenta*.

(C). Colocasia.

A case of leaf disease caused by *Phytophthora colocasiae* was received from Langkawi Island. This is the first record of the occurrence of this fungus on its eponymous host in Malaya.

Manila Hemp.

The mushroom *Marasmius semiustus* attacked Manila hemp at Serdang and Johore. The fungus grows on the outer leaf sheaths of the pseudostem and, in damp weather, may cause the older leaves to wither prematurely. If these leaves dry up more rapidly than they are replaced by new growth the plants become stunted and, on poor soil, may be killed. *Poria Ravenalae* was recorded as a saprophyte on the leaves affected by Marasmius.

Tapioca.

A heavy mortality from root disease was reported from an area in Lower Perak where tapioca had been planted on heavy clay subject to waterlogging. The fungus responsible for the death of the plants was *Sphaerostilbe repens*.

Covers and Green Manures.

Rust (*Maravalia Crotalariae*) of crotalaria was very prevalent all over the country in 1937-1938, except at Cameron Highlands, where the fungus does not appear to occur. The fungus is responsible for appreciable damage to the foliage of *Crotalaria* spp., but the attacks are rarely fatal. Another rust fungus, which occurs on Tephrosia, has recently (1939) been identified by H. Sydow as *Ravenelia tephrosiicola* Hiratsuka

Crotalaria was severely attacked by *Sclerotium Rolfsii* at the Pineapple Experiment Stations in Johore and Singapore. This soil fungus is difficult to control and is easily spread over an area if diseased plants are allowed to remain in the soil. A fungus incrusting the stems of *C. usaramoensis*, in a manner suggesting the presence of pink disease (*Corticium salmonicolor*), was identified as *Spicaria* sp. Most of the members of this genus are saprophytic or entomogenous.

Mikania scandens, growing as a cover on eroded banana land, was badly attacked by leaf spot caused by fungus Cercospora. Prolonged dry weather probably created conditions suitable for attack by this fungus.

Arecanut.

A curious form of stem rot occurred on a few palms in Province Wellesley. The green portions of the stems developed small black spots which gradually increased in size, and finally a black rot of inner stem tissue occurred and the palms died. The alga Cephaleuros was growing vigorously on the outside of the green stems and leaves, but the rot in the stem appeared to be caused by the fungus *Nigrospora sphaerica*.

Sireh (*Piper Betle*).

An outbreak of wilt occurred in Perak in 1937. Outbreaks in previous years, in Pahang, have been due to the fungus *Phytophthora colocasiae*, but on this occasion a species of Pythium (identified by the Imperial Mycological Institute as *P. splendens* var. *hawaiianum*) was responsible.

Flowering Plants.

Numerous specimens of diseased flowering plants were sent in for examination and report during the period under review. Among these the following were of interest:—

(1) *Bacterium solanacearum*—causing slime disease of zinnea, marigold, cleome, phlox, brinjal, chili and giant sunflower.

Carnation wilt (*Fusarium* sp. and *Pythium complectens*). Leaf spot (*Alternaria dianthi*)

Ornamental shrub (*Metrosideris amentosa*), leaf spot of youngest leaves caused by *Pestalozzia* sp.: gaillardia, wilt, *Pythium aphanidermatum*: verbena, leaf spot, *Rhizoctonia* sp.: canna, bacterial rot, (*Bacillus cannae*).

The fungus Phoma was prevalent during the dry weather in July to September on Rose of Sharon, quisqualis, Lagerstroemia and Peltophorum causing leaf spot.

Sclerotium Rolfsii occasionally wiped out whole beds of coreopsis in private gardens.

Newly imported varieties of roses were attacked at Cameron Highlands by rust (*Phragmidium subcorticium*). The disease first appeared on var. Mrs. G. A. van Rosem and later affected var. Mme. Butterfly and var. Aroma. Burgundy mixture was found beneficial in controlling this disease, which in 1924-25 wiped out the variety Maman Cochet at Maxwell Hill, Taiping.

Miscellaneous Records.

Tea, leaf disease, *Phacosphaerella theae*.

Tea, thread blight, *Marasmius* sp.

Tea, decayed root, *Ganoderma resinosum*.

Japanese cherry (*Muntingia calabura*), heart rot and root disease, (undetermined Basidiomycete, probably *Fomes* sp.).

Tung Oil (*Aleurites montana*) from Burma, leaf disease associated with *Colletotrichum* sp. and *Acremoniella* sp.

Peach, rust of leaves, *Puccinia pruni-spinosae*.

Apple, leaf blotch, *Phyllosticta* sp. and *Phomopsis* sp.

Hevea, leaf disease, *Phyllosticta ramicola*.

Pepper, black rot, *Cephaleuros parasiticus*.

Pepper, leaf and fruit anthracnose, *Colletotrichum* sp.

Albizzia moluccana, root and stem decay, Hydnoid *Merulius* sp. and *Ganoderma applanatum*.

Cardamom, fruits, *Nigrospora sphaerica*.

Dahlia, leaf spot, *Cladosporium* sp.

Carpet grass, leaf rot, *Acrothecium* sp.

Ragi, root rot, *Sclerotium Rolfsii*.

Legislation Affecting Importation of Plants.

Consideration was given to the question of amending the Plant Importation Rules, S.S., to permit the importation of certain fresh fruits into the Colony by air.

The amendment came into force on October 7th, 1938, under the new title of "Plant Importation (amendment) Rules 1938," and, subject to inspection and special permit, permits the entry by air transport of fresh nectarines, peaches, pears, plums, strawberries, red and black currants, raspberries, and gooseberries. At present one firm is contemplating importing such fruits from Australia.

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RICE IN MALAYA IN 1938

By
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Agricultural Economist.

Prices.

The average wholesale prices of rice per picul in Singapore in 1938 were as follows:—Siam No. 2 ordinary $4.26, Rangoon No. 1 $3.74, Saigon No. 1 $3.94, as compared with $4.39, $3.75 and $3.92 respectively in 1937. Of the net imports during the year 61.5 per cent. were from Siam, 34.1 per cent. from Burma, 2.6 per cent. from French Indo-China and 1.8 per cent. from other countries. On this basis, the actual average price of rice consumed in this country during the year under review was $4.17 per picul, as compared with $4.08 per picul in 1937.

Retail prices were lower in 1938 than during the preceding year. The average retail prices for 1938 in cents per gantang of No. 2 Siam rice were as follows:—Singapore 28, Penang 32, Malacca 28, as compared with 30, 36, and 32 respectively in 1937.

It will be seen, therefore, that while both wholesale and retail prices of imported rice were lower in 1938 than in 1937, the average price paid by the consumer was greater in 1938 by reason of the fact that he purchased more of the expensive grades.

The main exporting countries in the East are Burma, Siam and French Indo-China, while exports from India continue to decline sharply and this country is now, on balance, an importing country. Reports from the exporting countries show favourable prospects for the new season crops, and there is, therefore, no reason to anticipate any shortage of supplies or any drastic upward price movements in 1939.

There was no change in the ocean freight rates to Malaya and no major changes in local railway rates for transport of rice.

The details of wholesale and retail prices are given in Table I.

Imports and Exports.

A statement of annual imports and exports, with values, for the past ten years is given in Table II, from which it will be seen that consumption of imported rice in 1938 increased by 7 per cent. and value of net imports by 6 per cent. Consumption of imported rice was the highest since 1930. Imported rice for local consumption during the year under review cost $40,433,064, and reflects the statement given above that not only has total consumption increased, but in particular the consumption of the high-priced grades.

The net imports of rice in 1938 were 612,394 tons as compared with 573,063 tons in 1937. Of the 1938 net imports 376,635 tons were from Siam, 208,690 tons from Burma, 15,692 tons from French Indo-China and 11,377 tons from other countries, as compared with 289,283, 250,792, 23,623 and 9,365 tons respectively in 1937.

The different grades of rice products imported during 1938 were as follows (net imports only are given):—cargo rice 33,319 tons, parboiled 69,337 tons, white rice 430,494 tons, broken rice 79,244 tons, as compared with 26,328, 62,738, 424,870 and 59,127 tons respectively in 1937.

Table I

Average Prices of Rice in Malaya in 1938.

Month	Wholesale Prices of Rice Dollars per picul (133 1/3 lbs.)			Retail Prices of Rice Cents per gantang (gallon)			Price of Padi per Picul at Government Rice Mills, Perak
	Siam No. 2 (ordinary)	Rangoon No. 1	Saigon No. 1 (Long Grain)	Singapore	Penang	Malacca	
January ...	4.11	3.95	4.00	28	32	28	2.00
February ...	4.15	3.82	3.92	28	32	28	2.10
March ...	4.09	3.62	3.92	28	32	28	2.10
April ...	3.98	3.62	3.85	28	32	28	2.10
May ...	4.16	3.90	3.92	28	32	28	2.10
June ...	4.25	3.95	3.87	28	32	28	2.10
July ...	4.39	3.92	4.02	28	32	28	2.10
August ...	4.34	3.82	4.05	28	32	28	2.10
September ...	4.46	3.85	4.10	29	35	28	2.10
October ...	4.47	3.70	4.07	29	34	30	2.30
November ...	4.40	3.50	3.90	28	32	30	2.30
December ...	4.27	3.20	3.65	28	32	30	2.30
Average 1938	4.26	3.74	3.94	28	32	28	2.14
Average 1937	4.39	3.75	3.92	30	36	32	1.99
Average 1936	3.86	3.44	3.59	28	29	26	1.91

Table II

Rice: Malayan Imports and Exports.

Year	Imports		Exports		Net Imports	
	Tons	Value $	Tons	Value $	Tons	Value $
1929 ...	785,558	95,461,036	233,897	28,031,407	551,661	67,429,629
1930 ...	800,443	87,666,723	208,688	23,361,561	591,755	64,305,162
1931 ...	691,112	48,458,102	175,385	13,453,189	515,727	35,004,913
1932 ...	592,209	39,632,925	183,209	12,660,493	409,000	26,972,432
1933 ...	592,912	33,846,158	159,746	9,493,291	433,166	24,352,867
1934 ...	619,199	32,813,558	165,968	8,609,566	453,231	24,203,992
1935 ...	655,845	40,114,794	184,463	11,060,993	471,382	29,053,801
1936 ...	715,632	43,053,805	181,837	10,846,378	533,795	32,207,427
1937 ...	711,581	47,800,364	138,518	9,589,376	573,063	38,210,988
1938 ...	814,870	53,822,372	202,476	13,389,308	612,394	40,433,064

Note—The above table does not include figures for padi and rice bran, flour and meal.

The total quantity of rice products imported for local consumption in 1938, including bran, rice flour and rice meal of which 155,068 tons valued at $5,019,269 were imported for consumption locally, amounted to 767,462 tons valued at $45,452,333, as compared with 725,051 tons valued at $43,310,804 in 1937. The net imports of padi, which amounted to 4,791 tons, valued at $191,023, are not included in the above figures.

Areas and Yields in Malaya.*

The area planted with "wet" padi in the season 1937-38 was 682,120 acres, a decrease of 11,430 acres over the previous year's record figure of 693,550 acres. The Federated Malay States showed a decrease of 7,750 acres, the Straits Settlements 1,280 acres, and the Unfederated Malay States of 2,400 acres. This decrease is in part due to an unfavourable season, but the lower figure is also due to a very much closer estimate which it has been found possible to effect in some areas. In most districts it is considered that the estimates of area probably are within ±5 per cent. of the true figure. Compared with 1936-37, the figures showing the largest decreases in area are Perak 3,000 acres, due partly to a more accurate estimate, Selangor 5,000 acres, due to the abandonment of one large unsuitable area and to more accurate estimate, Johore 2,000 acres and Perlis 2,000 acres, while an increased figure of 3,000 acres is shown in Kelantan due to the introduction of a new system of compilation.

Table III.

Areas and Yields of Padi.

Year	"Wet" Padi		"Dry" Padi			Total	
	Area Acres	Yield Gantangs	Area Acres	Gantangs Per Acre	Yield Gantangs	Gantangs Per Acre	Area Acres	Yield Gantangs
1929 - 30	629,650	103,624,000	164	27,550	3,160,000	114	657,200	106,784,000
1930 - 31	603,070	166,845,000	277	104,670	9,122,000	87	707,740	175,967,000
1931 - 32	635,130	184,631,000	291	89,850	12,472,000	139	724,980	197,103,000
1932 - 33	674,920	186,345,000	276	91,990	13,416,000	146	766,910	199,761,000
1933 - 34	691,110	215,098,000	311	74,140	9,389,000	127	765,250	224,487,000
1934 - 35	669,290	213,835,000	319	65,440	6,720,000	106	734,730	220,555,000
1935 - 36	674,900	219,786,000	325	50,150	8,087,000	161	725,050	227,873,000
1936 - 37	693,550	206,256,000	297	46,490	6,354,000	137	740,040	212,610,000
1937 - 38	682,120	193,240,000	283	44,550	6,020,000	135	726,670	199,260,000

(Acreage to nearest 10 acres: yields to nearest 1,000 gantangs)

* Estimating the area and yields of padi presents great difficulty, and the following figures are therefore given with due reservations.

Table IV.
Area of Land Planted in Malaya and Yield of Rice.

Season	F.M.S.		S.S.		U.M.S.		Total	
	Area Acres	Production Rice Tons	Area Acres	Production Rice Tons	Area Acres	Production Rice Tons	Area Acres	Production Rice Tons
1929 - 30	174,466	55,577	67,005	25,944	415,727	78,815	657,198	160,335
1930 - 31	178,930	57,027	67,350	39,503	461,460	167,672	707,740	264,202
1931 - 32	194,580	67,658	67,980	39,626	462,420	188,664	724,980	295,948
1932 - 33	214,160	76,331	70,530	36,051	482,220	187,539	766,910	299,921
1933 - 34	195,690	78,835	70,550	44,180	499,010	214,053	765,250	337,068
1934 - 35	176,750	79,559	68,500	43,988	489,480	207,617	734,730	331,164
1935 - 36	178,020	78,011	67,750	37,818	479,280	226,321	725,050	342,150
1936 - 37	185,730	80,872	69,090	37,622	485,220	200,740	740,040	319,234
1937 - 38	176,880	68,185	67,650	33,853	482,140	197,152	726,670	299,190

(Yield estimated on a basis of 666 gantangs of padi = 1 ton of rice)

The production of "wet" padi in the season 1937-38 was 193,240,000 gantangs, a decrease of 13,016,000 gantangs over the previous year. The cause of this lower figure is due in great measure to an attempt to institute a more thorough investigation into the methods of arriving at figures of yield. In some of the more important areas the method is to compare crop-cutting tests with estimates prepared by headmen; in other cases reliance is almost entirely on headmen's figures, while elsewhere closer official figures may be obtained by measurement of crops in the owners' stores and comparative crop-cutting tests.

But it is admitted that the best available method may give an error of ±15 per cent., while in less accessible areas the error may be ±50 per cent. The most, therefore, that can be said for these figures is that in the aggregate they are an approximation, and in view of the local knowledge of the compilers, they may provide a good index figure to compare the crop of one year with another.

It is an undoubted fact that the season under review was in most States less suitable for the crop than the previous season; the unsuitable season was mainly responsible for the decrease of 8,450,000 gantangs in the Federated Malay States, 2,510,000 gantangs in the Straits Settlements, and 2,390,000 gantangs in the Unfederated Malay States. The Perak figures alone account for about 6,000,000 gantangs of the total decrease.

"Dry" padi areas are unimportant. The area, as was expected, continues to decline, but the crop reaped in the past season was up to average.

Table V

Area of Land planted in Malaya and Yields of Padi Season 1937 — 1938.

Territory.	Wet		Dry		Total	
	Acres	Gantangs	Acres	Gantangs	Acres	Gantangs
F.M.S. :—						
Perak ...	90,230	24,281,000	1,430	260,000	91,660	24,541,000
Selangor ...	14,970	3,572,000	180	46,000	15,150	3,618,000
N. Sembilan ...	33,630	9,683,000	40	6,000	33,670	9,689,000
Pahang ...	36,090	7,522,000	310	41,000	36,400	7,563,000
TOTAL ...	174,920	45,058,000	1,960	353,000	176,880	45,411,000
S.S. :—						
P. Wellesley ...	32,280	8,513,000	140	22,000	32,420	8,535,000
Penang ...	3,010	1,290,000	—	—	3,010	1,290,000
Malacca ...	31,510	12,605,000	—	—	31,510	12,605,000
Labuan ...	710	116,000	—	—	710	116,000
TOTAL ...	67,510	22,524,000	140	22,000	67,650	22,546,000
*U.M.S.** :—						
Johore ...	6,080	754,000	180	19,000	6,260	773,000
Kedah ...	245,700	82,490,000	1,530	218,000	247,230	82,708,000
Perlis ...	39,610	10,174,000	—	—	39,610	10,174,000
Kelantan ...	115,990	26,531,000	30,510	4,358,000	146,500	30,889,000
Trengganu ...	32,310	5,709,000	10,230	1,050,000	42,540	6,759,000
TOTAL ...	439,690	125,658,000	42,450	5,645,000	482,140	131,303,000
TOTAL MALAYA ...	682,120	193,240,000	44,550	6,020,000	726,670	199,260,000

Note.—Acreage to the nearest 10 acres. Yield to the nearest 1,000 gantangs.

* Excluding Brunei for which figures are not available.

Table VI

Malayan Production of Rice in Relation to Net Imports and Consumption 1930—1938

	1930	1931	1932	1933	1934	1935	1936	1937	1938
Net imports (tons)	591,755	515,727	409,000	433,166	453,229	474,955	533,795	573,063	612,394
Production (tons)	160,335	264,202	295,948	299,921	337,068	331,164	342,150	319,234	299,190
Consumption (tons)	752,090	779,929	704,948	733,087	790,297	806,119	875,945	892,297	911,584
Percentage of production to net imports	27	51	72	69	74	69	64	56	49
Percentage of production to consumption	21	34	42	41	43	41	39	36	33

Consumption Compared with Production and Imports.

Last year it was anticipated that Malaya would be able to show in 1938 a slightly more favourable balance between local production and total consumption, but the unexpected considerable increase in net imports of rice (the highest on record) and the somewhat disappointing figures of local production have resulted in a further decline in the percentage of production to consumption and the percentage of production to net imports. Malaya now produces approximately one-third of her rice requirements, while the huge bill for imported rice ($40,433,064 in 1938) is the largest since 1930. (See Table VI).

Prospects for the 1938-39 Season.

The prospects of the 1938-39 rice crop were reviewed in the main areas of production at the end of 1938. It is anticipated that in most States the area under cultivation will at least be equal to that of the previous season while an appreciably increased planted area is reported from Kedah and Perlis. In Kedah the crop is expected to be about 10 per cent. greater than in the previous season, while a normal crop is anticipated in Perlis.

In Kelantan early rains were unevenly distributed and subsequent floods in some areas caused loss. In two Districts the prospects are reported to be fair to moderately good; in one District a heavier crop than usual is anticipated; in one District a 20 per cent. reduction in yield is expected, while in the remaining District the crop prospects are better than last year. The total crop from this large centre of production therefore holds a fair promise of a return not less than last year.

In Trengganu dry weather delayed planting, and subsequent floods occasioned damage to the crop. The "dry" padi promises well.

Province Wellesley and Penang reports are to the effect that while the present season cannot expect to excel the heavy crops reaped in Penang last year, the crop in the Province is generally considered to be better.

In the Krian area the crop should be satisfactory unless very unseasonable weather is experienced. The acreage is rather more than last year. In other parts of Perak prospects are promising.

Reports from Pahang state that difficulties have been experienced in the inland areas due to inadequate water supplies. On the coastal areas crops may be rather better than in the previous season. The report concludes by estimating that the total acreage in the State will not be less and perhaps may be more than in 1937-38 and a crop of 7 million gallons should be realized.

Summing up the general impression one obtains from these reports, it would appear that the area planted in Malaya in the current season is rather larger than last season, and that the crop harvested should be appreciably greater than in the 1937-38 season.

Milling.

There are two Government Rice Mills at Krian, Perak, and one at Temerloh, Pahang. The Krian mills purchased a total of 12,272 tons of padi during the year, and at Temerloh the purchase of 228 tons of padi constituted a record.

Many small power-driven rice mills have been erected in the main producing areas of the Peninsula. There are now thirty-seven such mills in Kedah as compared with sixteen at the end of the previous year. Ten similar mills were in operation in Perak, with a further six in course of erection or contemplated.

In Province Wellesley, also, in addition to the old established large mills, seven small mills have now come into operation with a further four under construction. In Kelantan, the Tumpat mill was able to purchase considerably more local padi than in the previous year.

A Malay Rice Millers' Association has been formed in Province Wellesley, the principal objects being to prevent unnecessary competition and to exchange information on the marketing of milled products.

Acknowledgments.

The Field Branch of the Department of Agriculture, in collaboration with the Land Officers, is responsible for the estimates of areas and yields summarized in Table V. The figures for imports and exports and relative values are obtained from Malayan Statistics, published by the Statistics Department, S.S. and F.M.S.

Abstracts.

THE POSITION OF COFFEE ON THE WORLD MARKETS.*

Production and Consumption.

World production of coffee in the season 1937-38 (1 July to 30 June) was 5,474 million lbs. as compared with 5,661 million lbs. in 1936-37. Brazil was the most important producer with 3,412 million lbs., followed by Colombia 569 million lbs. and other South American countries contributing 738 million lbs. Non-American countries produced 564 million lbs., the chief country of production being the Netherlands Indies with 264 million lbs. Other countries of production are India, Ethiopia, Tanganyika, Kenya, Angola, Madagascar and Belgian Congo, together producing 300 million lbs.

The volume of world net imports of coffee, which in 1935 and 1936 showed an appreciable recovery over the preceding years, fell slightly in 1937 to 3,476 million lbs., but still exceeded by about 215 million lbs. the 1927-31 average. The net quantity of coffee absorbed in 1937 by Europe reached the very high figure of 1,521 million lbs., an increase of about 40 millions on the previous year and 57 millions on the 1927-31 average. On the other hand, the net imports into the United States of America in 1937, which amounted to 1,690 million lbs., show a decrease practically equal to the increase of imports into Europe, so that the total volume of imports in 1937 in Europe and the United States—which together absorb more than 90 per cent. of world imports—remained almost without variation from those of 1936. Consequently, the slight decrease in net world imports in 1937 over the preceding year is due almost entirely to other countries, whose consumption of coffee is very small.

Position of Brazil in the Coffee Market.

International trade in coffee is dominated by the new monetary and commercial policy adopted by Brazil in November 1937.

The part played by Brazil in world supplies, with the very marked annual oscillation of the last 10 years and despite the increase in world net imports, has undergone a very appreciable recession, falling on the average from 71.4 per cent. to 62 per cent. between 1909-13 and 1927-31. In more recent years the maximum was attained in 1933 with 62.3 per cent. and minimum in 1937 with 47.1 per cent.

On the other hand, the contribution of "milds" shows a very marked gradual increase, which has not only balanced the relative decrease in Brazilian exports, but has in a large measure satisfied the increased world requirements. It follows that the increase in world requirements has benefited especially the countries produc-

* Abstract of an article entitled World Statistical Position of Coffee, by A. di Fulvis published by the International Institute of Agriculture, Rome, in *Monthly Crop Report and Agricultural Statistics*, May, 1938.

ing "milds."* The rôle of Brazil in world supply, also in consequence of her valorization policy, has been reduced to that of supplying the difference between world coffee consumption and total production in other coffee-growing countries which have been able to move their annual crops in a normal fashion.

Measures Designed to Regulate the Market.

In the expectation of an abundant Brazilian crop in 1937-38, the producing states in that country, under the auspices of the Departmento Nacionel do Cafe, in 1937 adopted a series of resolutions for the prevention of any further deterioration in the situation of the national and world coffee markets. Among the resolutions the Departmento Nacionel do Cafe was to acquire 70 per cent. of the total crop at fixed prices, the remaining 30 per cent. to form the part delivered to the free market according to conditions laid down by shipping companies. In the season 1936-37, 41.4 per cent. of the production was destroyed, while in the following season there was an intensification of the policy of coffee destruction. From the middle of 1931 to the end of March 1938, of an aggregate production in Brazil of 23,209 million lbs., 7,902 million lbs. were destroyed.

In consequence of this regulated destruction, the volume of stocks was reduced by more than 55 per cent. from 2,454 million lbs. at the end of 1936 to 1,112 million lbs. at the end of 1937. The greater part of the stocks is held in the interior of the country, for arrivals of coffee at ports of shipment are regulated so that available stocks are maintained, distributed at different ports, at 327 million lbs.

On the international plane, the dominating factor in coffee policy at the beginning of the 1937-38 season was the Second Pan-American Coffee Conference at Habana, of which the object was to bring about a complete agreement between the principal American coffee-producing countries with a view to sustaining the international market. The work of this and the preceding Conference and the efforts subsequently made by the Pan-American Coffee Office at New York have had no concrete results and the world coffee market has had to face a new situation. Brazil has abandoned her valorization policy and has resolutely taken the road of free competition and the coffee-producing countries have entered on a price war.

Conclusions.

The situation of the world coffee market in consequence of the price war has become more precarious. It is not possible to forsee exactly future developments, which involve the vital interests of a large number of producing countries whose

* According to W. H. Ukers, in his book "All About Coffee", there are two general classifications of coffee, "Brazils" and "Milds". A little more than two-thirds of the world's supply comes from Brazil, while the "milds", produced in other countries, make up the other third. Among the mild coffees there is much greater variation in characteristics than is found among the Brazilian growths. Mild coffees generally have more body, more acidity, and a much finer aroma than Brazils; and from the standpoint of quality they are far more desirable in the cup. "Milds" are important for blending purposes, most of them possessing distinctive individual characteristics, which increase their value as blending coffees.—*Ed., M.A.J.*

economy is intimately linked with this crop. There is no doubt that the statistical position of the product has improved in recent years in consequence of the drastic measures adopted by Brazil. The problem of coffee, however, as far as the two closely interdependent factors of production and consumption are concerned, has not yet been solved, for the annual production of Brazil alone is sufficient at present to meet almost the entire world demand. It is thus necessary to envisage and realize an all-round agreement between the coffee countries, notably as regards production and distribution of the product in these countries and the elimination, or reduction to a minimum, by means of an international agreement, of the obstacles, of which the principal is customs duties, that limit the world consumption of the product.

WHALE OIL PRODUCTION.

According to the latest issue of Vegetable Oils and Oilseeds* the number of whales killed in the Antarctic in the 1937-38 season was 44,000, producing 541,000 tons of oil. These figures showed an increase of 10,000 whales and 98,000 tons over the previous season. The output of whale oil, the most important of the marine fatty oils, now competes very seriously with the vegetable oils, particularly in northern Europe. In 1937 whale oil constituted 25 per cent. of all oils and fats used in the margarine, compound lard and soap industries in the United Kingdom, and in 1935 it represented 50 per cent. of the oils and fats used by the margarine and edible fat industry in Germany. Norway and the United Kingdom are still the principal countries concerned in the production of whale oil, but Germany and Japan, in particular, have recently taken a larger part.

From 1930 to 1937 an average of 92 per cent. of the world supply of whale oil was obtained from the Antarctic whaling grounds, where the bulk of the oil is extracted on board floating factories moving along the edge of the icefields. Total output increased rapidly till it reached the record of 614,000 tons in 1931, when a very large quantity remained unsold. The great expansion of the industry in the Antarctic had by that time overshadowed whaling in other parts of the world, where the whaling stocks had been depleted by intensive fishing and modern methods of hunting. In 1932 the whole Norwegian fleet was laid up and world production was reduced by 75 per cent., thus giving an opportunity for accumulated stocks to be absorbed. In the two subsequent seasons production in the Antarctic, which was limited by agreement, was steady at about 400,000 tons each season, although production elsewhere tended to rise. In the next two seasons the Antarctic production increased substantially, reaching 541,000 tons in 1937-38.

* Vegetable Oils and Oilseeds. Printed and Published for the Imperial Economic Committee by H. M. Stationery Office, November 1938. 116 pp. Price 2s. 9d. post free. The previous issue of this publication was reviewed in *The Malayan Agricultural Journal*, Vol. XXVI, No. 4, April 1938.

In 1937, an International Agreement was signed by nine countries which had for its object the maintenance of the stock of whales by limiting the whaling season, forbidding the killing of certain kinds and closing certain areas of the Atlantic, Pacific and Indian Oceans.

At a second Conference in London in June 1938 certain modifications and extensions were decided upon. These were embodied in a Protocol signed by ten countries, the Final Act of the Conference being in addition signed by two other countries, including Japan, which country, however, signed with certain reservations.

World production of whale oil in 1937 was 535,000 tons.* The provisional figures for export of oilseeds and vegetable oils from the producing countries in 1937 were: oilseeds approximately 10,000,000 tons, and vegetable oils 1,100,000 tons. Chief amongst the former were soya beans, linseed and groundnuts, each of which had a production slightly over 2,000,000 tons, copra 1,500,000 tons, palm kernels 750,000 tons, and cottonseed 835,000 tons. Of vegetable oils palm oil ranked first with a production of 495,000 tons, coconut oil 296,000 tons and tung oil 101,000 tons.

* In 1938 it appears probable that the total production will be about 650,000 tons. *Ed. M.A.J.*

Reviews.

Examination of some Tinned Foods of Historic Interest.

Publication No. 85 of the International Tin Research and Development Council. Reprinted from "Chemistry and Industry" 1938.

New light on the origin and early products of the canning industry is made available in this publication. The report is a reprint of papers recently read before the Food Group of the Society of Chemical Industry by Professor J. C. Drummond and others.

The papers describe how a number of tins of meats and vegetables which had reposed in the Royal United Services Museum and the National Maritime Museum, London, were opened and submitted to chemical and bacteriological analysis. Two of the tins, one containing veal and the other carrots, had accompanied Sir Edward Parry, the Arctic Explorer, on his famous expeditions in search of the North-West Passage in 1824, and when opened they proved to be still in "what one could fairly call perfect condition." The reports of the various analyses are given in detail with photographs of the actual cans. The first part of the booklet recounts briefly the discovery of the principles of the canning process by Nicholas Appert in France and their adaptation by a celebrated English engineer and Vice-President of the Royal Society, Bryan Donkin, so that robust canisters of tinplate could be used instead of Appert's fragile glass jars. So successful was Donkin that within seven years his tinned foods factory at Bermondsey, the first in the world, was supplying tens of thousands of large tins to the Navy for Australian and Arctic expeditions and later as "medical comforts" for crews of ships on ordinary voyages.

There are some interesting sidelights on the theories advanced at the time for the success of the canning process and also a report upon some dried vegetables in tins which were packed for the army during the Crimean War.

Copies of the above publication may be obtained free of charge by application to the Secretary of the International Tin Research and Development Council, Fraser Road, Greenford, Middlesex.

International Bibliography of Agricultural Economics.

Quarterly publication. Rome. Annual subscription 6s. 6d. post free.

The International Institute of Agriculture in Rome has commenced quarterly publication of a bibliography dealing with agricultural economics in all its various phases. This bibliography, which is based on the material received by the Library of the Institute, is compiled under the technical direction of the Librarian, Dr. S. von Frauendorfer.

The International Bibliography of Agricultural Economics covers the economic and social aspects of agriculture, such as agricultural economics, agricultural policy, settlement, credit, co-operation, insurance, marketing, prices, statistics, farm organization and management, valuation, labour, accounting, rural sociology, agricultural history and geography, legislation and education and all other agricultural problems, in so far as they are considered from the economic and social point of view. Only publications of purely technical character are excluded. Titles of all publications, whether books, bulletins, pamphlets or articles in periodicals, are indicated, including all bibliographical details required for proper identification. All languages receive equal treatment and titles in the less known languages are provided with a translation.

The bibliography, which is the only one which covers systematically the world literature on agricultural economics, is carefully classified by subjects. An author-index will be supplied at the end of each volume.

The Planters Gazette and Annual.

Vol. 1, No. 1. Published by the Planters Gazette and Annual, 9, Royal Street, Calcutta. Subscription Rs. 6 per annum.

The first number of this journal deals with various aspects of agriculture in India. Pride of place is given to the tea industry on which crop there are no less than fourteen articles. The Journal, however, covers a wide range of interests and includes informative original articles on coffee, cattle, tobacco, wheat, rice, cotton, timber, sugar and jute, and in addition information on such subjects as agricultural economics, health, trade and labour.

The Planters Gazette claims to present a true picture of the varied agricultural and planting activities in India. The first number sets a high standard of both literature and production, and should prove of value to agriculturists in other tropical countries. We wish sucess to this addition to the list of journals dealing with tropical agriculture.

Departmental.

FROM THE DISTRICTS.

Compiled by the Chief Field Officer from Monthly Reports of Agricultural Officers.

February, 1939.

The Weather.

In the west coast areas wet weather continued during the first week in February; thereafter conditions were hot and dry. In North Kedah the dry weather commenced rather earlier, and hot dry northerly winds prevailed which tended to intensify the drought.

In Pahang light but regular falls of rain occurred and the total precipitation approximated to the average.

Conditions in Kelantan were extremely dry; the highest rainfall for the month occurred at Pasir Puteh (1.42 inches) and the lowest at Tumpat (0.0 inches). The rainfall figures for January at these two recording stations were 58.14 inches and 30.62 inches respectively.

The weather in North Johore was particularly dry and total precipitation was well below the average for February. In other parts of the State dry weather was also experienced, but showers occurred frequently.

Crop Reports.

Rubber.—Rubber trees are now wintering; as the crop obtainable is always less during this period, tapping on small holdings and estates will undoubtedly be curtailed.

The Asiatic Rubber Instructors in Kelantan report that the production of lump rubber has now been eliminated in all districts. This satisfactory state of affairs is the result of two years of intensive demonstration and propaganda, which have been aided considerably by market conditions. At present dealers pay an extra 50 cents per picul for sheet known to be acid coagulated, up to $2 extra per picul for clean and well prepared smoked sheet, and up to $4 extra for prime smoked sheet. The Department has given small rubber growers assistance in marketing their product and also loans for the purchase of equipment for sheet manufacture.

Most of the smoke houses now being constructed in this State are of a medium size and are not the small cabinet type. They are usually built co-operatively and the owners smoke and sell their rubber collectively, grading it, if necessary, before sale. In other parts of the country there appear to be few of the small smoke cabinets now working, and considering the good price at present being paid by dealers for unsmoked sheet, this is only to be expected. The present ready market for unsmoked sheet is further exemplified by the practice of certain Pahang dealers who have ceased to smoke the sheet they purchase, and now send it straight to

Kuala Lumpur where the large dealers smoke it. Under present circumstances officers of the Department and Asiatic Rubber Instructors have had to content themselves with advocating the manufacture of clean sheet.

During the recent tour of the Rural Lecture Caravan in Perak at each stopping place the opportunity was taken of explaining to the audience the new rules relating to planting and replanting under Rubber Regulation. In the more rural districts many small-holders were entirely ignorant or quite incredulous of these rules.

Padi.—In North Kedah the harvest is now almost complete, and in the Central and South Districts is well in hand. After receiving reports on the areas so far reaped, considerable optimism is felt locally as to the total crop likely to be harvested and it is expected to exceed last year's by a considerable amount.

During the last month the weather has been dry and conditions perfect for harvesting.

In Province Wellesley it is reported that unemployed rubber tappers have entered the padi growing areas in large numbers to take part in the harvest. Harvesters customarily receive as payment 20 gantangs of padi in every 100 gantangs that they reap.

Government rice mills in Perak are continuing to pay a premium of 10 cents per picul on sealed bags of Seraup 48 of the new season's crop.

Over the greater part of Pahang the harvest is now completed. The rice mill at Temerloh has been buying larger quantities of padi than in previous seasons. A total of 910 piculs was bought during the month at a price of $2 to $2.20 per picul. Although weather conditions during part of the season were very unfavourable, the crop harvested has been better than had been expected and some reports state the yields to be greater than those of the season before.

Livestock.

During the past year 10,500 cattle and buffaloes have been slaughtered for consumption in Kelantan. This is the first time that these figures of local consumption have been collected and the total is unexpectedly high. In addition 1,000 head of cattle were exported. There has lately been an increase in activity in the export trade. This trade is potentially a valuable one, but in the past it has been hampered by restrictions. These have been eased to some extent since the new Cattle Enactment came into force.

The Farm Schools.

The new term at the Malacca Farm School will begin during March. Forty-two applications for entry were received, but of these applicants only 33 were allowed to sit for the entrance examination, as past experience has shown the wisdom of admitting only boys who come from rural areas. Hence applicants from the town area were refused permission to sit for the examination. As a result of the examination twenty-five of the boys were selected; of these the first ten will receive free tuition.

Applications are now also being received for the next term at the Penang Farm School.

DEPARTMENTAL NOTES.

Appointment.

Mr. R. G. H. Wilshaw, Chemist, Malayan Agricultural Service, has been appointed to the post of Senior Chemist (Soils) with effect from 15th June, 1938, inclusive.

School of Agriculture Poultry Housing Methods in Siam.

The Department of Agriculture and Fisheries, Siam, exhibited three of the Malayan School of Agriculture Portable Night Arks and Day Shelters in the Poultry Section of the Constitutional Fair held at Bangkok from 8th to 14th December 1938. It is reported that these exhibits attracted considerable attention and were all sold to poultry enthusiasts at the close of the Fair.

Two night arks are also in use at the South Siam Agricultural Experiment Station, Haadyai, Siam, and the Chief of this Station states that he intends to increase the number.

Poultry Leaflet No. 2 describes the construction and use of the School of Agriculture Night Ark and Day Shelter, and can be obtained on application to the Principal, School of Agriculture, Malaya, P.O. Sungei Besi, Selangor, F.M.S.

Distribution of Material from Agricultural Stations.

Monthly reports of Agricultural Officers supply evidence of the growing importance of Agricultural Stations in supplying improved planting material, poultry, and eggs for hatching.

The list of planting material supplied during February, for instance, is too long and varied for details to be given in this place. In addition to quantities of seed of various vegetables, fruits and padi, distributions included 112 fruit plants, either seedlings or budded plants, 47 bags of grasses and cover crops, and 212 lbs. of seed of various cover crops. Fowls and chicks for breeding numbered 85, and fowls' eggs for hatching 67. Fungicides for treating rubber diseases are sold in certain centres, and over 100 gallons was disposed of in February.

Visit to British North Borneo.

Arrangements have been made for the Agricultural Officer, Brunei, to visit the Jesselton district of British North Borneo in order to purchase buffaloes to be shipped to Brunei for supply to padi cultivators.

Leave.

Mr. H. L. Barnett, Assistant to Agricultural Economist, returned from leave on 10th February, 1939.

Mr. H. K. Ashby, Agricultural Officer, returned from leave on 23rd February, 1939.

Mr. R. G. H. Wilshaw, Senior Chemist (Soils), returned from leave on 24th February, 1939.

FERTILIZER PRICES, FEBRUARY, 1939.

The following are the prices at the end of February, 1939, of some of the more important fertilizers.

Product.	Analysis				Price per ton $
	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)	
		Soluble	Insoluble		
Sulphate of Ammonia ...	20.6	—	—	—	72.75
Calcium Cyanamide ...	20.6	—	—	—	80.00
Muriate of Potash ...	—	—	—	50	112.00
Sulphate of Potash ...	—	—	—	48	112.00
Superphosphate (concentrated) ...	—	39	—	—	105.00
Superphosphate ...	—		—	—	60.00
Basic Slag ...	—	16	—	—	48.00
Rock Phosphate (Christmas Island) ...	—	11*	38‡	—	33.50
Rock Phosphate (very finely ground Gafsa) ...	—	11*	26 - 28‡	—	40.00
Lime ...	—	—	—	—	20.00

* Citric soluble. ‡ Total

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham, Klang and Singapore.

The above quotations for concentrated superphosphate, superphosphate and Christmas Island phosphate are *ex* warehouse Penang, Port Swettenham and Klang. The Singapore quotations for these three fertilizers are $95, $50 and $31.50 per ton respectively.

Statistical.

MARKET PRICES.

February, 1939.

Major Crops.

Rubber.—Following the decision of the International Rubber Regulation Committee to make no alteration in the quota release for the second quarter the Singapore price of rubber rose steadily after an initial rise and fall in the first half of the month. No. 1 X. Rubber Shoked Sheet, loose, opened in Singapore at $26\frac{3}{4}$ cents per lb. and closed at $28\frac{1}{2}$ cents, after reaching $28\frac{5}{8}$ cents on the 27th. The average of daily quotations was 27.24 cents per lb. as compared with 27.26 cents in January. The London average quotation per lb. was 7.96d. and New York 15.85 cents gold, as compared with 7.96d. and 15.72 cents gold in January.

Prices paid for small-holders' rubber at three centres during the month are given in Table I.

Table I.

Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, February, 1939.

(Dollars per picul of 133 1/3 lbs.)

Grades	Kuala Kangsar, Perak		Kuala Pilah, Negri Sembilan			Batu Pahat, Johore.			
	15	22	2	9	16	1	8	15	22
Smoked Sheet	33.00	34.18	32.00	33.00	34.25	—	—	32.48	—
Unsmoked Sheet	—	—	31.00	32.00	—	30.68	31.02	31.94	32.48
Scrap	No purchases								

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.
Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.
Transport from Kuala Kangsar to Prai by railway $6.20 per ton.
Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).
At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.
At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent
No purchases of rubber at Kuala Kangsar on 1st and 8th and at Kuala Pilah on the 23rd February.

Palm Oil.—Prices improved slightly during the month as shewn in Table II. January averages of weekly quotations were:—palm oil £13.0.0, kernels £8.11.3 per ton.

Table II.

Prices of Palm Oil and Palm Kernels.

Date 1939.	Palm Oil in Bulk, c.i.f. landed weight Liverpool/ Halifax. per ton	Palm Kernels, c.i.f. landed weight London/ Continent per ton
February 3	£ 13. 0. 0 Liverpool	£ 8. 10. 0 Continent
„ 10	13. 0. 0 „	8. 12. 6 „
„ 17	13. 5. 0 Canada	8. 12. 6 Rotterdam
„ 24	13. 10. 0 Liverpool	8. 17. 6 Hamburg
Average	£ 13. 3. 9	£ 8. 13. 2

Copra.—There was a distinct improvement in this market during February and prices rose steadily from $3.35 to $3.80 per picul for the sun-dried grade. The average Singapore price for this grade was $3.53 per picul, and for the mixed grade $3.23, as compared with $3.30 and $3 in January.

The price of copra cake remained unchanged at $1.60 per picul.

Rice.—The Singapore average wholesale prices of rice per picul in January were as follows: Siam No. 2 Ordinary $4.22, Rangoon No. 1 $2.92, Saigon No. 1 $3.30, as compared with $4.27, $3.20 and $3.65 in December and with $4.11, $3.95 and $4 in January 1938.

The average retail prices in cents per gantang (gallon) of No. 2 Siam rice were: Singapore 27, Penang 32, Malacca 30, as compared with 28, 32 and 30 in December.

The average declared trade value of imports during January was $3.78 per picul, as compared with $3.85 in December and $3.85 in November and $4.04 in January, 1938.

Padi.—In Perak South padi prices per 100 gantangs (gallons) ranged from $5.50 to $13; in Perak Central the price was $8.50, and in Perak North $12. The price in Pahang was $7 to $12, and in Selangor from $8 to $12. Kedah and Province Wellesley were $7, Kelantan $8.70, and Negri Sembilan $6.50 to $10.

The Government Rice Mills, Krian, Perak, paid $2 per picul for padi, and the Government Rice Mill, Temerloh, Pahang, $2 to $2.20. The Kedah mills paid from $1.80 to $1.85 per picul.

Pineapples.—Singapore prices of canned pineapples, per case of 48 cans of 1½ lbs. each, were as follows:—G.A.Q. Spiral $3, Round $4, Cube $3; Golden $3.40, $4.30 and $3.45 respectively. The month's harvest was very small, and practically all the present season's pack has been sold.

Fresh fruit prices in Singapore were $1 to $1.80 per 100, and in Johore $1.30 to $1.60 for 1st quality, $1 to $1.20 for 2nd quality, and 60 to 90 cents for 3rd quality.

Beverages.

Tea.—Two consignments of Malayan lowland tea, comprising 140 packages, were sold on the London market in February at 11¼d. and 1s.0d. per lb., the average price being 11.63d. per lb. One consignment of 102 packages from Cameron Highlands was sold in London at 1s.3d. per lb.

According to the *Tea Market Reports* for February of the Tea Brokers' Association of London, the average London prices per lb. realized for tea from other countries were as follows:—Ceylon 1s.3.07d., Java 1s.0.09d., Indian Northern 1s.1.16d., Indian Southern 1s.1.80d., Sumatra 10.83d.

The latest Colombo average prices available, quoted from *The Ceylon Tea Market Report* of 28th February 1939 of the Colombo Brokers' Association, are as follows, in rupee cents per lb.:—High Grown Teas 87, Medium Grown Teas 74, Low Grown Teas 66.

Coffee.—Liberian coffee was quoted at $14.75 per picul throughout the month but weakened to close at $14.50. Excelsa and Robusta were quoted at $10.25 and $6.50 respectively throughout the month.

The average of highest and lowest quotations in Singapore for Palembang coffee was $9.87 to $10.87, and for Sourabaya coffee $11.50 to $12.62, the price within these ranges depending upon quality.

Spices.

Arecanuts.—The averages of Singapore Chamber of Commerce quotations per picul were: Best $7.35, Medium $6.81, Mixed $6.31.

The averages of highest and lowest quotations per picul in Singapore were as follows:—Splits $4.50 to $7.60; Red Whole $6.20 to $9.37; Sliced $9 to $11.75; as compared with $10.06 to $7.81, $7.75 to $5.75, and $6.12 to $4.37 respectively in January.

Pepper.—Prices continued to show an upward trend with the exception of Singapore Black which fell back slightly in the second half of the month. Average prices per picul in Singapore were as follows:—Singapore Black $8.62, Singapore White $13.19, Muntok White $13.44, as compared with $8.50, $12.37 and $12.62 respectively in January.

Nutmegs.—The Singapore price of both 110's and 80's improved to $30, averaging $29.50 for the month as compared with $28 in January. Penang dried nutmegs were sold at $20 per picul.

Mace.—The nominal quotations for Siouw in Singapore rose to $85 per picul averaging $82.50 for the month. Amboina continued unchanged at $60 per picul. In Penang, locally produced mace, dry, was sold for $75 per picul.

Cloves.—Nominal quotations in Singapore for both Zanzibar and Amboina remained unchanged at $40 per picul. Penang cloves, dried, sold in Penang at $45 per picul.

Cardamoms.—Green cardamoms were quoted in the *The Ceylon Chamber of Commerce Weekly Report* for 27th February, 1939, from Rs. 1.10 to Rs. 1.21 per lb.

Miscellaneous.

Derris.—The average prices in Singapore for root sold on a basis of ether extract remained unchanged at $8 to $10 per picul, but root sold on rotenone content improved slightly to average $18 to $20 per picul as compared with $17 to $19 in January. The demand shows some improvement, but little business is passing as growers are holding out for higher prices.

Our New York correspondent reports on January 18 that the market shows little change, 5 to 6 per cent. elliptica root being offered at 5⅝d. per lb. c.i.f. New York, 8 per cent. root at 7⅛d., and 17 per cent. malaccensis at about 4d. per lb.

Cubé root, on the other hand, has not come down perceptibly from prices current last season, and the competition between derris and cubé products for the coming season is now keen. There is now very little difference between the selling price of derris powder and licensed cubé powder, and there is no longer any doubt that considerably larger quantities of derris root will be used by the United States market this year than in 1938.

Gambier.—Prices in Singapore continued unchanged: Cube No. 1 $15 per picul; Block at $7 nominal per picul.

Sago.—Pearl depreciated by 5 cents per picul in Singapore to average $3.71 per picul as compared with $3.75 in January. Flour, Sarawak Fair, improved 5 cents, averaging $2.24 per picul as compared with $2.19 in January.

Tapioca.—Seed Pearl and Pearl Medium continued unchanged at $3.90 and $4.50 per picul respectively, but Flake Fair weakened 5 cents at the close to average $3.89 per picul.

Tobacco.—Kelantan prices of locally grown tobacco remained high, 1st grade $100 to $160 per picul, 2nd grade $75 to $128, 3rd grade $50 to $112. In Kedah the range was $38, $26 and $20, and in Province Wellesley and Penang $40, $33 and $22. Negri Sembilan prices were $15 to $48, $13 to $45, and $10 to $40. In Perak South the three grades were $22 to $27, $14 to $21, $9 to $18, and in Perak Central $25.50, $17.50 and $8.75. In Johore North dried leaf ranged from $3 to $15 per picul, and prepared tobacco from $20 to $60, while in Johore Central dried leaf reached $42, and prepared tobacco $128 per picul.

The above prices are based on London and Singapore daily quotations for rubber, on the Singapore daily prices for copra, on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports and certain coffee prices are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur, the Singapore prices of imported coffee and arecanuts by Lianqui Trading Company of Singapore, and Singapore derris prices by Messrs. Hooglandt & Co., Singapore.

1 Picul = 133 1/3 lbs. The Dollar is fixed at two shillings and four pence.

Note.— The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Trafalgar Square, London, W.C.2.

GENERAL RICE SUMMARY*

January, 1939.

Malaya.—The imports of foreign rice during January were 72,094 tons,† and exports 19,446 tons, net imports being 52,648 tons as compared with 43,183 tons in 1938.¶

Of the January imports 49 per cent. were consigned to Singapore, 18 per cent. to Penang, 7 per cent. to Malacca, 21 per cent. to the Federated Malay States and 5 per cent. to the Unfederated Malay States. The foreign imports by countries of origin were as follows (in tons, percentages in brackets):—Siam 48,915 (67.8), Burma 18,099 (25.1), French Indo-China 3,819 (5.3), other countries 1,261 (1.8).

Of the exports during January 70 per cent. were consigned to the Netherlands Indies, and 30 per cent. to other countries. The various kinds of rice exported were as follows (in tons, percentages in brackets):—Siam 14,152 (72.8), Burma 4,052 (20.8), French Indo-China 444 (2.3), parboiled 751 (3.9), Malayan production 47 (0.2).

January net imports, by countries of origin, were (in tons, percentages in brackets):—Siam 34,763 (62.8), Burma 14,047 (33.0), French Indo-China 3,375 (2.4), other countries 463 (1.8).

India.—Foreign exports during 1938 totalled 260,000 tons as compared with 690,000 tons in 1937, a decrease of 62.3 per cent. Of these exports 1.9 (3.7) per cent. were to the United Kingdom, 3.1 (5.5) per cent. to the Continent of Europe, 38.8 (29.3) per cent. to Ceylon, 5.0 (20.9) per cent. to the Straits Settlements and the Far East, and 51.2 (40.6) cent. to other countries. The figures in brackets are for the corresponding period of 1937.

Burma.—Foreign exports from the 1st to 25th January were 227,339 tons, as compared with 186,320 tons in 1938, an increase of 22.0 per cent. Of these exports 61.4 (46.5) per cent. were to India, 7.9 (11.6) per cent. to the United Kingdom, 0.5 (nil) per cent. to the Continent of Europe, 15.4 (20.4) per cent. to Ceylon, 11.0 (16.1) per cent. to the Straits Settlements and the Far East, and 3.8 (5.4) per cent. to other countries. The percentages in brackets are for the corresponding period of 1938.

Average January prices in rupees per 100 baskets of 75 lbs. each in Rangoon were:—Big Mills Specials 187, Small Mills Specials 190.

According to the fourth forecast of the rice crop in Burma for the year 1938-39, the area likely to mature is estimated at 12,584,000 acres, a decrease of 55,300 acres since the issue of the third forecast, and 6,900 acres less than the area actually matured last year.

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* Abridged from the Rice Summary for January 1939 compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† Ton = long ton (2,240 lbs.)

¶ It is to be understood throughout the summary that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1937 or 1938.

The district reports now indicate that this year's crop will yield about 8,225,400 tons of padi as against 6,918,800 tons estimated at this time last year. The exportable surplus of the 1938-39 crop is now estimated at 3,600,000 tons of rice and rice products which may be taken as the equivalent of 4,865,000 tons of padi.

Siam.—November 1938 exports of rice and rice products from Bangkok were 107,254 tons, with a total for the eleven months of 1,354,908 tons as compared with 850,448 tons in 1937.

The following is a summary of crop conditions at the end of December 1938. The area cultivated totalled 7,780,662 acres, an increase since the last report of 247,395 acres. The damaged area is now estimated to be 759,055 acres, an increase of 65,657 acres, and 9.8 per cent. of the area planted. The total harvested area was approximately 2,803,084 acres, with a yield of 1,725,265 tons of padi.

Japan.—The actual rice crops of Japan for the year 1938 amounted to 9,238,302 tons, a decrease of 0.6 per cent. as compared with the actual crops of the previous year.

French Indo-China.—Entries of padi into Cholon during January were 174,418 tons, as compared with 122,060 tons in 1938, an increase of 42.9 per cent. January exports of rice were 92,714 tons as compared with 87,962 tons in 1938, an increase of 5.4 per cent.

The general tendency of prices of rice and padi in December was downwards.

Netherlands Indies.—The area harvested in Java and Madoera during January to September 1938 amounted to 9,003,150 acres, an increase of 1.8 per cent. over 1937.

Imports of rice into Java and Madoera during the same period totalled 21,992 tons, as compared with 1,493 tons in 1937, an increase of 1,373 per cent., and into the Outer Provinces 215,819 tons as compared with 88,714 tons, an increase of 143.3 per cent.

Ceylon.—January imports were 47,466 tons as compared with 39,974 tons in 1938, an increase of 18.7 per cent. Of these imports 14.0 (12.6) per cent. were from British India, 65.7 (76.9) per cent. from Burma, 1.4 (1.9) per cent. from the Straits Settlements, and 18.9 (8.6) per cent. from other countries. The percentages in brackets are for the corresponding period of 1938.

Europe and America.—Shipments from the East to Europe from 1st January to 29th December 1938 totalled 1,169,756 tons, an increase of 2.7 per cent. as compared with 1,138,781 tons in 1937. Of these shipments 39.3 (37.9) per cent. were from Burma, 47.7 (56.2) per cent. from Saigon, 11.9 (4.4) per cent. from Siam, and 1.1 (1.5) per cent. from Bengal. The 1937 percentages are in brackets.

Shipments for the Levant during 1938 totalled 29,645 tons as compared with 16,289 tons in 1937, an increase of 82 per cent. Shipments for Cuba, West Indies and America from 1st January to 23rd December aggregated 179,778 tons as compared with 227,717 tons in 1937, a decrease of 21.1 per cent.

MALAYAN AGRICULTURAL EXPORTS, DECEMBER, 1938.

PRODUCT.	Net Exports in Tons			
	Year 1937	Year 1938	December 1937	December 1938
Arecanuts ...	30,084	33,769	3,078	2,370
Coconuts fresh ...	95,223†	116,743†	8,569†	14,924†
Coconut oil ...	39,762	49,140	3,660	5,108
Copra ...	75,592	68,754	9,647	4,164
Gambier, all kinds ...	1,955	1,632	76	113
Copra cake ...	15,026§	7,112	734§	626
Palm kernels ...	7,312	9,359	495	939
Palm oil ...	42,787	54,377	3,236	4,511
Pineapples, canned ...	80,502	73,168	5,103	4,500
Rubber ...	503,127¶	360,898¶	50.212¶	25,240¶
Sago,—flour ...	15,478	4,537	2,002	695
,, —pearl ...	3,759	4,203	253	250
,, —raw ...	8,256*	5,088*	673*	263*
Tapioca,—flake ...	1,058	981	51	84
,, —flour ...	2,393*	3,072*	288*	229*
,, —pearl ...	18,786	17,818	1,682	1,324
Tuba root ...	573	676	21	88

† hundreds in number. * net imports. ¶ production. § gross exports.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates)

Month 1939	Palm Oil		Palm Kernels	
	F.M.S.	U.M.S.	F.M.S.	U.M.S.
January	2,402.5	3,385.0	429.7	502.0
January 1938	2,241.7	1,309.2	383.7	232.0
Total for the year 1938 ...	28,979.0	22,087.7	5,158.9	3,620.0

Stocks on estates as at 31st January, 1939, were: palm oil 3,191 tons, palm kernels 670 tons.

ACREAGES OF TAPPABLE RUBBER ACTUALLY TAPPED AND NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 31ST JANUARY, 1939.

STATE OR TERRITORY	Estimated Acreages of Tappable Rubber (9)+(11	ACREAGES OF TAPPABLE RUBBER NOT TAPPED				Area of tappable rubber never been tapped (b)		Total area not tapped (3)+(5) (c)		TOTAL AREA TAPPED DURING THE MONTH		Area of tappable rubber rested under rotational systems (c)	
		On estates which have entirely ceased tapping		On estates which have partly ceased tapping (a)									
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to 2)	Acreage	Percentage of (7) to (2)	Acreage	Percentage of (9) to 2)	Average	Percentage of (11) to (2)	Acreage	Percentage of (13) to (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
S. S.—													
Province Wellesley ...	43,375	834	1.9	15,566	35.9	510	1.2	16,400	37.8	26,975	62.2	7,989	18.4
Malacca ...	121,423	5,236	4.3	32,885	27.1	2,179	1.8	38,121	31.4	83,302	68.6	26,325	21.7
Penang ...	2,478	nil	nil	1,165	47.0	9	0.4	1,165	47.0	1,313	53.0	60	2.4
Singapore ...	32,157	6,134	19.1	10,289	32.0	135	0.4	16,423	51.1	15,734	48.9	3,239	10.1
Total S.S. ...	199,433	12,204	6.1	59,905	30.0	2,833	1.4	72,109	36.1	127,324	63.9	37,613	18.9
F. M. S.—													
Perak ...	285,899	10,277	3.6	76,413	26.7	8,151	2.9	86,690	30.3	199,209	69.7	49,176	17.2
Selangor ...	321,440	6,566	2.0	64,655	20.1	7,397	2.3	71,221	22.1	250,219	77.9	60,076	18.7
Negri Sembilan ...	257,445	14,924	5.8	64,580	25.1	7,930	3.1	79,504	30.9	177,941	69.1	44,495	17.3
Pahang ...	86,809	7,322	8.4	25,828	29.8	6,967	8.0	33,150	38.2	53,659	61.8	10,402	12.0
Total F.M.S. ...	951,593	39,089	4.1	231,476	24.3	30,445	3.2	270,565	28.4	681,028	71.6	164,149	17.3
U. M. S.—													
Johore ...	481,141	21,014	4.4	131,837	27.4	35,400	7.4	152,851	31.8	328,290	68.2	71,617	14.9
Kedah ...	196,584	8,595	4.4	33,019	16.8	8,473	4.3	41,614	21.2	154,970	78.8	44,344	22.6
Kelantan ...	31,323	403	1.3	7,758	24.8	2,483	7.9	8,161	26.1	23,162	73.9	5,388	17.2
Trengganu (d) ...	4,817	nil	nil	49	1.0	nil	nil	49	1.0	4,768	99.0	1,651	34.3
Perlis (e) ...	1,394	323	23.2	311	22.3	98	7.0	634	45.5	760	54.5	164	11.8
Brunei ...	5,746	nil	nil	2,740	47.7	316	5.5	2,740	47.7	3,006	52.3	506	8.8
Total U.M.S. ...	721,005	30,335	4.2	175,714	24.4	46,770	6.5	206,049	28.6	514,956	71.4	123,670	17.2
Total MALAYA ...	1,872,031	81,628	4.4	467,095	24.9	80,048	4.3	548,723	29.3	1,323,308	70.7	325,432	17.4

Notes.—(*a*) Area out-of-tapping on estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.

(*b*) The acreage shown in column (7) is included in columns (3) and (5).

(*c*) Areas of tappable rubber rested under rotational systems are not considered as out-of-tapping and therefore columns (11) and (12) include columns (13) and (14) respectively.

(*d*) Registered companies only.

(*e*) Figures for quarter ending 31st December, 1938.

ACREAGE, STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF JANUARY, 1939, IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January 1939		during the month		January 1939						
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. 1939	during the month	Jan. 1939	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. 1939
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MALAY STATES :—																				
Federated Malay States ...	...	4,783	26,848	10,679	10,679	6,339	6,339	Nil	Nil	Nil	Nil	12,709	3,544	12,709	3,544	...	5,770	26,608	18	18
Johore ...	...	2,155	10,028	4,552	4,552	3,575	3,575	Nil	33	Nil	33	3,055	5,049	3,055	5,049	...	2,385	9,854	...	...
Kedah ...	...	132	5,902	2,727	2,727	1,213	1,213	Nil	Nil	Nil	Nil	1,279	2,580	1,279	2,580	...	295	5,820	...	...
Perlis ...	...	5	38	12	12	32	32	Nil	Nil	Nil	Nil	Nil	38	Nil	38	...	17	32	...	...
Kelantan ...	...	396	692	234	234	560	560	Nil	Nil	Nil	Nil	237	574	237	574	...	443	628	...	...
Trengganu ...	...	4	336	83	83	193	193	Nil	Nil	Nil	Nil	Nil	284	Nil	284	...	40	292	...	...
Brunei ...	...	Nil	100	43	43	81	81	...	...	...	...	...	110	...	110	...	14	100	...	...
Total Malay States	...	7,475	43,944	18,330	18,330	11,993	11,993	Nil	33	Nil	33	17,280	12,179	17,280	12,179	...	8,964	43,334	18	18
S. SETTLEMENTS :—																				
Malacca ...	...	1,708	2,340	1,028	1,028	441	441	Nil		Nil		2,853		2,853		...	1,435	2,345	...	...
Province Wellesley	...	938	1,089	414	414	157	157	Nil		Nil		5,083		5,083		...	1,691	1,041	...	...
Penang ...	1,969	3,187	15	18	18	50	50	2,358	11,090	2,358	11,090		Nil		Nil	2,216	4,152	18	...	...
Singapore ...	4,183	17,760	282	104	104	29	29	16,624		16,624		18,116		18,116		2,923	21,696	304	27	27
Labuan ...	...	9	Nil	Nil	Nil	10	10	67		67		Nil		Nil		...	23	Nil	...	...
Total Straits Settlements ...	6,152	23,602	3,726	1,564	1,564	687	687	19,049	11,090	19,049	11,090	25,052	Nil	26,052	Nil	5,139	28,997	3,708	27	27
Total Malaya ...	6,152	31,077	47,670	19,894	19,894	12,680	12,680	19,049	11,123	19,049	11,123	43,332	12,179	43,332	12,179	5,139	37,961	47,042	45	45

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	5,042	21,227	4,004	2,938	1,884	162
WET RUBBER	728	469	148	225	501	133
TOTAL ...	5,770	21,696	4,152	3,163	2,385	295

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. 1939
29	30	31
Singapore ...	30,713	30,713
Penang ...	8,653	8,653
Port Swettenham.	3,833	3,833
Malacca ...	133	133
MALAYA ...	43,332	43,332

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. 1939
32	33	34
Malay States ...	29,411	29,411
Straits Settlements	2,829	2,829
MALAYA ...	32,240	32,240

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula : Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month, + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S and F.M.S., at Singapore on 25th February, 1939

METEOROLOGICAL SUMMARY, MALAYA, JANUARY, 1939.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hrs.	hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	89.2	71.6	80.4	94	69	80	74	82.9	83.7	13.18	334.8	3.22	20	16	6	4		169.80	5.48	46
Bukit Jeram, Selangor ...	87.6	71.6	79.6	90	70	81	73	83.1	85.3	10.23	259.8	4.10	20	14	1	1		207.60	6.70	56
Sitiawan, Perak ...	87.6	72.1	79.9	91	68	78	75	82.7	83.5	5.87	149.1	1.57	17	14	5	1		172.90	5.58	47
Ipoh Aerodrome, Perak ...	88.3	71.4	79.9	92	68	74	74	81.6	83.0	10.01	254.3	3.10	14	12	7			160.60	5.18	43
Temerloh, Pahang ...	85.1	71.4	78.3	89	69	75	74	82.2	84.4	7.10	180.3	2.63	18	14		9		145.25	4.69	39
Kuala Lipis, Pahang ...	84.7	70.2	77.5	90	67	75	72	80.8	82.5	12.32	312.9	3.54	24	20		18		120.50	3.89	33
Kuala Pahang, Pahang ...	81.7	73.5	77.6	85	70	77	76	78.9	80.7	16.06	407.9	4.04	23	20				128.40	4.14	35
Kallang Aerodrome, S'pore ...	85.3	73.9	79.6	89	72	77	76	81.0	82.3	10.69	271.5	3.17	19	17	1			171.45	5.53	46
Bayan Lepas Aerodrome Penang ...	86.7	73.6	80.1	90	70	78	77	82.0	83.3	5.52	140.2	2.38	12	9	2			209.75	6.77	57
Malacca Town, Malacca ...	84.9	72.6	78.7	88	70	74	74	80.5	82.3	4.75	120.7	1.07	18	14	5		3	174.90	5.64	47
Kluang, Johore ...	85.3	71.2	78.3	89	69	74	73	79.9	81.3	12.76	324.1	3.59	20	16	3	4		168.00	5.42	45
Mersing, Johore ...	81.2	72.6	76.9	85	70	74	77	78.7	79.7	25.28	642.1	6.66	21	19			1	141.80	4.51	38
Alor Star, Kedah ...	86.4	70.9	78.7	91	67	77	74	82.0	83.7	1.59	40.4	0.55	10	6				193.60	6.25	53
Kota Bahru, Kelantan ...	82.3	71.5	76.9	86	67	74	75	78.9	81.7	40.14	1019.6	9.66	21	19		1		153.30	4.95	42
Kuala Trengganu, Trengganu	81.1	72.0	76.5	85	68	75	76	78.7	80.6	55.68	1414.3	18.32	21	20		1	3	136.25	4.39	37
Labuan ...	85.3	76.6	80.9	90	74	81	80	85.1	85.6	8.26	209.8	5.08	10	8	2		1	222.10	7.16	60
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	69.3	60.6	64.9	76	58	64	63	69.4	70.3	11.92	302.8	2.29	24	23	1	23	1	104.85	3.38	28
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	70.0	56.6	63.3	73	48	65	62	68.0	68.5	7.18	182.4	1.54	24	15		2		97.70	3.15	26
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	69.9	58.1	64.0	74	55	65	60			7.77	197.4	1.64	22	15			2	102.00	3.29	28

* Not recorded.

Compiled from Returns supplied by the Meteorological Branch, Malaya.